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VIA FEDERAL EXPRESS

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Re: Direct Reuse of Sunrise Power Project Water for Enhanced Oil Recovery

Dear George and Karen:

Thank you for giving us the opportunity last week to explain the planned reuse of water from the Sunrise Power Project for enhanced oil recovery ("EOR") operations at Texaco California, Inc.'s ("TCI's") Midway-Sunset Oilfield. As promised, this letter follows up with additional information about this reuse project (the "Project").

As an initial matter, let me reiterate that we are not seeking a formal approval from EPA for the Project. Instead, our objective was to brief you about the Project details, our interpretation about how the underground injection control ("UIC") program regulations apply, and the steps that the California Division of Oil, Gas and Geothermal Resources ("DOGGR") will take to evaluate the request for approval of this Project. Separately, Sunrise intends to seek permits from EPA for back-up disposal wells for its used water for those occasions when TCI cannot use the water for EOR operations. But the regulatory issues raised by injection for disposal are different than those associated with the planned reuse of the used Sunrise water in TCI's EOR operations and are not the subject of this letter. Rather, the lone issue for which we are seeking your opinion at this time relates to the proposed project using the Sunrise used water for enhanced oil recovery operations in TCI's existing Class II steam injection wells.

The Project has changed substantially since it was first brought to EPA's attention a year or more ago. The Sunrise power plant ("Plant") under construction is a peaker power plant and not a co-generation facility. Importantly, the Plant will not use TCI's produced water from oil field operations as intake water, and the Plant will not discharge *any* wastewater to Valley Waste. Rather, the Plant will *exclusively use municipal grade water* as its intake source.

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The resulting discharge water will be treated (*i.e.*, softened) and used by TCI for steam injection in enhanced oil recovery operations. The steam injection wells are classified as Class II wells, and regulated by DOGGR which has primacy for this part of the UIC program.

The New Plant Project

The Plant will be a peak power generation facility, initially operating as a simple cycle facility. After about three years, the Plant will transition to a combined cycle facility. It is the water used in the Plant's simple and combined cycle activities, described in more detail below, that would be treated for eventual injection as steam.

The Plant will use municipal grade water from the West Kern Water District for its simple and combined cycle operations. The expected water quality parameters of this municipal grade water are attached as Exhibit 1.

During the simple cycle phase, the municipal grade water will be used for off-line compressor washes, evaporative cooling and other service activities. In this phase, the Plant is expected to provide TCI with up to 63 gallons per minute ("gpm") of high quality water for steam injection for EOR. The expected water quality parameters of the water coming from the simple cycle phase are attached as Exhibit 2.

Within three years or so, the Plant will be converted to a combined cycle phase. In this phase, Sunrise will need to purchase larger quantities of intake water from West Kern Water District, and the Plant will generate additional used water. For example, water that collects in equipment drains and from stormwater runoff will be sent to an oil/water separator, which will generate an effluent that needs to be managed. In addition, there will be cooling tower blowdown water. Used water flow is expected to reach approximately 400 gpm. As in the simple phase operations, the Plant will generate high quality discharge water that can be reused for steam injection in EOR operations in the Midway-Sunset Oilfield. The expected water quality parameters resulting from combined cycle operations are attached as Exhibit 3.

Whether generated during the simple cycle phase or in the combined cycle phase, the Sunrise discharge water will not be hazardous. In fact, it will be of a better quality than the produced water that TCI currently softens and converts to steam for EOR. The Plant water will be piped directly to the TCI water treatment plant where it will be softened and eventually converted to steam for use in the steam injection projects.

Treated Plant Water for Steam Injection to Enhance Oil Recovery Fully Comports with Class II Well Regulations

As currently used, TCI's steam injection wells are Class II wells under either subsection (b)(1) or (b)(2) of 40 C.F.R. § 144.6. They are either wells that inject fluids (1) which are brought to the surface in connection with conventional oil production, or (2) for enhanced recovery of oil. Subsection (b)(1) only applies to injection of fluids produced from oil field

operations, but (b)(2) covers any fluids used for enhanced oil recovery. Thus, if the steam used in EOR projects is generated from water produced from oil field operations, the steam injection wells are Class II under either definitional subsection. But if the steam is generated in part from Sunrise treated water, the wells would only fit under the latter subsection.

The issue we discussed last Wednesday was whether the proposed reuse of Plant water for steam injection amounts to a Class I use of TCI's Class II wells. The relevant definition defines as Class I those injection wells which are "[i]ndustrial and municipal disposal wells which inject fluids beneath the lowermost formation containing, within one quarter mile of the well bore, an underground source of drinking water [(USDW)]." 40 C.F.R. § 144.6(a)(2).¹

This definition, in effect, sets out three requirements must be met to classify an injection well as Class I. First, the fluids being injected must be from an industrial source. Second, they must be injected for purposes of disposal. Third, the disposal must occur within a quarter mile of a USDW.

The facts show that the proposed steam injection does not fit into the Class I description. Although the Plant water comes from an industrial source, most importantly TCI is not injecting the water for disposal, but using it for EOR purposes. It would be wasteful to discard the water since, even after its use in the Sunrise Plant, it is of sufficiently high quality that it can be reused with only minimal demineralization for steam EOR.

Additionally, based on our information, the steam injection is occurring within formations that have been exempted from UIC requirements for USDWs. These exempted aquifers, as defined in 40 C.F.R. § 146.4, are not sources of drinking water and cannot be because they are part of a hydrocarbon producing formation. As George correctly noted at our meeting, when California was given primacy over the Class II program, aquifers in gas and oil fields, such as the aquifers at issue here, were exempted. Attached, as Exhibit 4, is a list of the aquifers exempted in the Midway-Sunset field. Thus, because aquifers in zones containing commercially viable quantities of oil were exempted in California, and because injection for EOR is only used to recover oil in such zones, the designation of an exempted aquifer means that such wells will not be considered as affecting a USDW. We also judge, given the extensive exemption of aquifers as well as the preponderance of production wells, EOR wells and other Class II wells in this region, that there is not likely to be a USDW within a quarter-mile, the third requirement for a Class I well.

¹ 40 C.F.R. section 144.6(a)(1) describes Class I wells used by generators, owners or operators to inject hazardous waste. Given that the water is neither hazardous, nor waste, this code section is inapplicable.

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Conclusion

As we have outlined above and as we discussed with DOGGR, we believe that the proposed use of the Sunrise water as steam in the TCI EOR wells is properly within the Class II uses defined by EPA's UIC regulations. Although the Sunrise water is from an industrial source, it will not be disposed of, but directly reused as steam in TCI's enhanced oil operations.

With this understanding, TCI is moving ahead with a request for approval for use of the Sunrise water in its EOR wells from DOGGR which has primacy for these wells. It is DOGGR's plan, once they have an acceptable application, to publish a legal notice in the newspaper providing opportunity for public comment. Following the comment period, DOGGR will make its final decision.

Given the importance of this project to help mitigate the potentially widespread summer blackouts expected this summer, we have planned first-fire of the turbines in June and made a commitment to the California Energy Commission to have it fully on-line by no later than August 1, 2001. To meet this schedule, we are making a major effort to touch base with all the affected or interested parties so that we can brief them about the plan and address any issues they may have. In this spirit, we stand ready to provide any other information that will help you evaluate the project, but we ask for your quick review. In order for this project to go ahead as planned, we need EPA's concurrence that the proposed use does not trigger any other UIC issues. It is our strong hope that your review will lead to the same conclusions that we have reached, but should you have any additional questions or concerns, please do not hesitate to contact me at (949) 798-7971.

Very truly yours,



Victor Yamada
Project Manager

cc: Mervyn Soares
Gene Lucero
Dave Stein
Phil Mineart

**Exhibit 1 Water Supply and General Water Quality
Parameters**

West Kern Water District

Calcium	74.0
Magnesium	11.0
Sodium	104.0
Potassium	1.0
M-alkalinity	106.0
Sulfate	40.0
Chloride	44.0
Silicon Dioxide	19.0
Total Dissolved Solids	299

Note: concentrations listed are milligrams per liter (mg/L) (parts per million)

Exhibit 2 Expected Simple Cycle Wastewater Quality — Discharge To TCI Plant 2-22

Constituent	Average Daily at 65°F
Flow, gal/day	28,800
Ca, mg/L as CaCO ₃	156
Mg, mg/L as CaCO ₃	46
Na, mg/L as CaCO ₃	320
K, mg/L as CaCO ₃	6
SO ₄ , mg/L as CaCO ₃	125
Cl, mg/L as CaCO ₃	127
Alkalinity, mg/L as CaCO ₃	271
SiO ₂ , mg/L	32
TDS, mg/L	798

Based on water mass balance in Figure 2-5

mg/L = milligrams per liter

TDS = total dissolved solids

Exhibit 3 Sunrise II Plant Discharge Characteristics

	Oil/Water Separator Effluent	Cooling Tower Blowdown	Combined Plant Effluent
Flow (gpm)	26	381	407
Ca (mg/L as Ca)	10	75	70
Mg (mg/L as Mg)	1	6	6
Na (mg/L as Na)	60	450	420
K (mg/L as K)	1	5	4
M-Alk (as CaCO ₃)	80	150	150
SO ₄ (mg/L as SO ₄)	40	720	670
Cl (mg/L as Cl)	30	200	190
NO ₃ (mg/L as NO ₃)	1	9	9
CO ₂ (mg/L as CO ₂)	1	420	390
SiO ₂ (mg/L as SiO ₂)	20	150	140
pH	6-9	6-9	6-9
TDS (mg/l)	160	1600	1500
TSS (mg/l)	30	50	50

Exhibit 4.**Non-Hydrocarbon Producing Zones Being Used For Wastewater Disposal and Exempted by CDOGGR District 4**

Field	Formation and Zone	Lateral Limits	Depth to Top (feet subsea)	Thickness (feet)	Remarks
Kern Front	Santa Margarita (Miocene)	Extends throughout the field	2,548	650	
Kern River	Chanac (Miocene to Pleistocene)	Extends throughout the field	1,100	568	
Kern River	Santa Margarita (Miocene)	Extends throughout the field	1,698±	325-515	
Kern River	Vedder (Miocene)	Extends throughout the field	4,850	136-375	
Lakeside	San Joaquin (Pleistocene)	Extends throughout the field	3,360	30	
Las Loblos	Tulare (Pleistocene)	Extends throughout the field	1,950±	1,550±	
Midway – Sunset	Tulare (Pleistocene)	Extends throughout the field	See Maps in CDOGGR Exemption	See Maps CDOGGR Exemption	Within the boundaries of the Midway Sunset field as defined in <i>California Oil and Gas Fields</i> , Volume I, 1973.
Mount Poso	Walker (Eocene-Oligocene)	Covers northeast half of field	1,939 (top of Vedder)	656-661	Injected only in combination with the laterally interfingered Vedder, which extends throughout the field
Mountain View	Kern River (Pleistocene)	Extends throughout the field	2,680	1,320±	

Pleito	Chanac (Pleistocene)	Extends throughout the field	2,756	634	
Pleito	Kern River (Pleistocene)	Extends throughout the field	3,272	384	

